Stabilizing the Cervical Spine

THE GOALS OF MANAGING patients with an unstable cervical spine are to prevent further neurologic injury, provide an optimal environment for neurologic recovery, and ensure a long-term, stable, pain-free spine. Correcting malalignment, immobilizing, and administering methylprednisolone sodium succinate if there is an acute spinal cord injury are the key factors to prevent further neurologic injury and provide the best environment for neurologic recovery. The use of very-high-dose methylprednisolone represents a major advance in the treatment of patients with spinal cord injury: methylprednisolone therapy improves motor and sensory return in patients with incomplete or complete spinal cord injury, but only if administered within eight hours of the injury.

The healing of damaged bone and soft tissue to provide a long-term, stable, pain-free spinal column requires immobilization by surgical or nonoperative means. Nonoperative techniques rely on external devices, such as the Halo vest, cervicothoracic brace, and Philadelphia collar. The Halo vest provides the most rigidity and the Philadelphia collar the least. Advances in surgical techniques permit rigid internal fixation of the cervical spine from either anterior or posterior approaches, reducing or eliminating the need for orthoses such as the Halo vest. Anterior techniques use titanium plates affixed to the vertebral bodies with screws. Posterior techniques include interspinous wire fixation, interlaminar clamps, or titanium plates affixed by screws inserted into the lateral mass of the cervical spine. The purpose of all these implant systems is to hold the spine in a rigid position while bone fusion occurs. All of the systems will eventually fail unless bone healing occurs. Therefore, surgical implants serve only as temporary splints.

These implants add substantially to the cost of an operation, with prices of plates varying from \$150 to \$1,000 and those of individual screws ranging from \$15 to \$75 each. Given the cost of these systems, what are the indications for using them? Implants are clearly indicated in certain kinds of cervical spine trauma, based on a classification of cervical spine stability developed by White and Panjabi. Bilateral jumped-facet injuries or burst fractures with substantial injury to the posterior ligamentous structures are likely to heal poorly if only an external orthosis is used; therefore, surgical intervention is likely to provide benefit. Less clear are indications for internal fixation and stabilization of degenerative spine disease. Unlike in trauma, ligamentous structures are likely to be intact and degenerative joint disease leads to reduced mobility of the cervical spine as a whole, making instability after surgical intervention less likely. Single-level fusion rates exceed 90%, making implants an unnecessary adjunct to good surgical technique. Implants can improve rates of fusion after bone grafting in multilevel anterior discectomy and fusion.

Metastatic disease to the cervical spine often weakens bone and ligaments, provoking spine instability with accompanying pain and possible neurologic compromise. Surgical intervention alone typically further destabilizes, making internal fixation devices important in these cases, especially as many of the patients are metabolically depleted because of disease or therapy. Implants provide important stability while bone and soft tissues heal.

Internal fixation devices in the cervical spine have reduced the need for cumbersome external orthoses, like the Halo device. Caution should be exercised by physicians in determining which patients are most likely to benefit from internal fixation. Anterior plate fixation devices (Morscher system, Caspar system) have been approved by the Food and Drug Administration (FDA) for implementation in the spine. The posterior, lateral mass plates are FDA-approved, but not specifically for use in the spine. Although the morbidity and mortality of surgical implantation are relatively low, sound judgment and experience will prevent the inappropriate use of these devices. Bone and ligamentous structures are most likely to be affected by trauma or metastatic disease and are therefore the most likely to demonstrate instability.

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Neuroendoscopy

THE FIRST NEUROENDOSCOPIC PROCEDURE was carried out 84 years ago. Recently there has been a renewed interest in neuroendoscopy and its role in the management of intracranial tumors, hydrocephalus, intracranial hematomas, neuroanatomic subarachnoid cistern navigation, and the management of lumbar disc protrusions.

The role of intracranial neuroendoscopy in the management of intracranial tumors is limited. Biopsy can certainly be done under direct vision for tumors within the ventricle. Specimens are small, however, which makes the tissue difficult to analyze. Tumors particularly amenable to an endoscopic approach are those in the lateral and third ventricles and those of the pineal region. The difficulties encountered with stereotactic approaches through the brain parenchyma, crossing pial surfaces blindly, are reduced with an intraventricular route. Colloid cysts of the third ventricle can also be aspirated and their walls coagulated using contact potassium-titanyl-phosphate or neodymium-yttrium-aluminum-garnet lasers. A direct visual approach with endoscopy reduces the risk of vascular injury at the foramen of Monro, which was sometimes reported with closed stereotactic approaches. Endoscopy may also have a role in the fenestration of tumor cysts that occur within the brain parenchyma and to allow for the communication of cysts with one another and with the ventricular system. Intraventricular cysts that are seen in children can also be